UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,965	02/13/2006	David Taubman	HAK-100-A	9052

48980 7590 12/09/2010

YOUNG BASILE
3001 WEST BIG BEAVER ROAD
SUITE 624
TROY, MI 48084

EXAMINER	
PRINCE, JESSICA MARIE	

ART UNIT	PAPER NUMBER
2482	

NOTIFICATION DATE	DELIVERY MODE
12/09/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@youngbasile.com
audit@youngbasile.com

Office Action Summary	Application No.	Applicant(s)	
	10/528,965	TAUBMAN ET AL.	
	Examiner	**Art Unit**	
	JESSICA PRINCE	2482	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 September 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,33,35-48,63 and 65-78* is/are pending in the application.

4a) Of the above claim(s) *34,49-62,64 and 79-93* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,33,35-48,63,65-78* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Acknowledgement of Amendment

Applicant's amendment filed on 09/17/2010 overcomes the following objection(s)/rejections(s);

The objection to the specification has been withdrawn in view of Applicants amendment.

The objection to claims 1, 33, and 34 have been withdrawn in view of Applicants amendments for minor informalities.

The rejection of claim 1 under 35 USC § 101 has been withdrawn in view of Applicants amendment.

The objection to the drawings have been withdrawn in view of Applicants amendment.

Response to Amendment

1. Applicant's election with traverse of Species I in the reply filed on 09/17/2010 is acknowledged. The traversal is on the ground(s) that Species III, IV, V, VI, and VII are not independent to and distinct to species I. This is not found persuasive because the specification as originally filed contains more than one species, where a further embodiment of a method for estimating and signaling motion information for a motion adaptive transform based on temporal lifting steps comprises the steps of: (a) estimating and signaling motion parameters describing a first mapping from a source frame onto a target frame within one of the lifting steps; and (b) inferring a second mapping between either said source frame or said target frame, and another frame,

based on the estimated and signaled motion parameters associated with said first mapping.

2. The examiner notes that claim 64 is directed towards a non-elected embodiment that is directed towards a method for estimating and commuting motion information required by a multi-frame encoding and decoding system and will treated as non-elected.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 33 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

3. Regarding claim 1, lines 3-8 recite the limitation ..."coding of transformed video samples using a <u>computer</u>, said method comprising the steps of: <u>storing computer-readable instructions in the computer, which when executed</u>... <u>storing computer-readable instructions in the computer, which when executed</u>... ". The examiner is unable to find where in the instant disclosure, as originally filed, described such steps of "..."coding of transformed video samples using a <u>computer</u>, said method comprising the

steps of: storing computer-readable instructions in the computer, which when executed... storing computer-readable instructions in the computer, which when executed.. ".

4. Regarding claim 63, lines 1-3 which recites "a non-transitory computer-readable storage medium with an executable program stored thereon, wherein the program instructs the computer to implement the method of claim 1". The examiner is unable to find where in the instant disclosure, as originally filed, described such steps of “a non-transitory computer-readable storage medium with an executable program stored thereon, wherein the program instructs the computer to implement the method of claim 1".

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 1 and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

2. Regarding claims 1 and 33, the term "successive contributions" renders the claim indefinite. It is unclear what is to be considered "incremental contributions".

3. Claims 35-48 and 65-78 which fails to remedy the issue as stated above for claim s 1 and 33, thus claims 65-78 are too rejected for being indefinite.

4. Regarding claim 38, this recites... "wavelet transforms and/or temporal transforms...” renders the claim indefinite. It is unclear if the transform is by applying

spatial discrete transform <u>or</u> temporal transforms, or if the transform is by applying spatial discrete transform <u>and</u> temporal transforms. For purposes of applying prior art, claim 38 is interpreted as temporal transform.

5. Claim 39 which fails to remedy the issue as stated above for claim 38, thus claim 38 is too rejected as being indefinite for depending upon claim 38.

6. Regarding claim 68, see the analysis made for claim 38.

7. Regarding claim 69, see the analysis made for claim 39.

8. Regarding claim 43, the term "perceptual relevance factors" renders the claim indefinite. It is unclear to the examiner what is to be considered as "perceptual relevance factors". For purposes of applying prior art, the examiner interprets “perceptual relevance factors” as a determinant.

9. Regarding claim 44, the term “spatial power spectrum” renders the claim indefinite. It is unclear as to what is to be considered as the "spatial power spectrum”.

10. Regarding claim 74, see the analysis made for claim 44.

11. Claim 46 which fails to remedy the issue as stated above for claim 44, thus claim 46 is too rejected as being indefinite for depending upon claim 44.

12. Regarding claim 46, the term “the power spectrum” renders the claim indefinite. It is not clear to the examiner what is to be considered as "the power spectrum".

13. Further, regarding claim 46, it is unclear to the examiner if "the power spectrum" is the same as "the spatial power spectrum of the video source" or if "the power spectrum of the video source" a second power spectrum of the video source?

14. Regarding claim 73, see the analysis for claim 43.

15. Regarding claim 74, see the analysis for claim 44.

16. Regarding claim 76, see the analysis for claim 46.

17. Claims 35 and 65 recite the limitation “the motion field parameters” in line 2. There is insufficient antecedent basis for this limitation in the claim.

18. Claims 36 and 66 recite the limitation “the node displacements parameters” in line 2. There is insufficient antecedent basis for this limitation in the claim.

19. Claims 4 and 71 recite the limitation “the expected distortion” and “the reconstructed video sequence" in line 3. There is insufficient antecedent basis for this limitation in the claim.

20. Claim 44 and 73 recite the limitation “the spatial power spectrum of the video source” in line 3. There is insufficient antecedent basis for this limitation in the claim.

21. Claim 45 and 75 recite the limitation “the spatial resolution” in line 2. There is insufficient antecedent basis for this limitation in the claim.

22. Claim 46 and 76 recite the limitation “the power spectrum” in line 1. There is insufficient antecedent basis for this limitation in the claim.

23. Claim 37 and 77 recite the limitation “the proportions” in line 2. There is insufficient antecedent basis for this limitation in the claim.

24. Claim 48 and 78 recite the limitation “the number of motion quality layers” in line 3. There is insufficient antecedent basis for this limitation in the claim.

25. Claim 65 and 35 recites the limitation “the motion field parameter” in line 2. There is insufficient antecedent basis for this limitation in the claim.

26.

Claim Rejections - 35 USC § 103

27. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

28. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

29. Claims 1, 33, 35-39, 40-41, 65-69, 70-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Han et al., US-6,845,130 in view of AAPA (Applicants Admitted Prior Art).

Regarding **claim 1**,Han teaches a method for incrementally coding and signaling motion information for a video compression system involving a motion adaptive transform and embedded coding of transformed video samples, using a computer, said method comprising the steps of: (a) producing an embedded bit-stream, representing each motion field in coarse to fine fashion (column 3 line 20-23). Han is silent in regards to interleaving incremental contributions from said embedded motion fields with incremental contributions from said transformed video samples.

However, AAPA teaches to interleave successive contributions from said embedded motion field bit-stream with successive contributions from said embedded coding of the transformed video samples ([0004]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of AAPA with Han for providing improved visual quality of video content.

Han (modified by AAPA) as whole is silent in regards to computer implement method. However, Nakaya teaches a system and method for performing video coding/decoding using motion compensation.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the system of Nakaya with Han (modified AAPA) for providing motion estimation process with a small amount of computations.

Regarding **claim 33**, this is the corresponding system of the method in claim 1. Thus the analysis and rejection made in claim 1 also applies here.

Regarding **claim 35** Han (modified by APPA and Nakaya) as a whole teaches everything as claimed above, see claim 33. Han is silent in regards to the system of claim 33, where the embedded motion field bit-stream is obtained by embedded quantization and coding techniques to the motion field parameter values.

However, AAPA teaches the embedded motion field bit-stream is obtained by embedded quantization and coding techniques to the motion field parameter values

(The motion parameters are encoded using an embedded quantization and coding strategy. Such strategies are now well known to those skilled in the art, see [0098]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of AAPA with Han (modified by Nakaya) for providing improved visual quality.

Regarding **claim 36**, Han (modified by AAPA and Nakaya) as whole teaches everything as claimed above, see claim 33. In addition, Han teaches the embedded motion field -bitstream (see col. 3 line 45-49 and fig. 3).Han is silent in regards to where the motion field bit- stream is obtained by coding the node displacement parameters associated with a triangular mesh motion model on a coarse to fine grid, each successive segment of the embedded bit-stream providing displacement parameters for node positions which lie on a finer grid than the previous stage, all coarser grids of node positions being subsets of all finer grids of node points.

However, Nakaya teaches the motion field bit- stream is obtained by coding the node displacement parameters associated with a triangular mesh motion model on a coarse to fine grid, each successive segment of the embedded bit-stream providing displacement parameters for node positions which lie on a finer grid than the previous stage, all coarser grids of node positions being subsets of all finer grids of node points continuous (Nakaya discloses where in FIG.3, for example, is composed of grid points 210, 211, 212, which function also as vertices of other patches. After the original image I202 is segmented into a plurality of patches this way, motion estimation is performed. In the shown example, motion estimation is performed with a reference image R201

with respect to each grid point. In the "motion compensation based on spatial transformations", as in the "block matching”, it is pointed out that the motion estimation based on matching is effective. An example algorithm base on matching is described below. This scheme is called the “hexagonal matching” and is effectively applied to the case where the motion vector continuously changes at the patch boundary. This scheme is configured of two processes: coarse motion estimation of grid points by “block matching”; and (2) correction of motion vector by "refinement algorithm". In process (1), the block matching is applied to a block of a given size containing a grid point, and the motion vector of this block is determined as a coarse motion vector for the grid points existing in the particular block. The object of process (1) is nothing but to determine a coarse motion vector of a grid point and is not always achieved using the block matching. The manner in which process (2) is carried out is shown in FIG. 4. FIG. 4 shows a part of a patch and grid points in the reference image R which corresponds to the reference image R203 in FIG. 3. Thus, changing the position of a grid point in FIG. 4 is indicative of changing the motion vector of the same grid point. In refining the motion vector of the grid point 301, the first thing to do is to fix the motion vectors of the grid points 303 to 308 representing the vertices of a polygon 302 configured of all the patches involving the grid point 301. The motion vector of the grid point 301 is changed with a predetermined search range in this way. For example, the grid point 301 is translated to the position of the grid point 309. As a result, the prediction error within each patch contained by the polygon 302 also undergoes a change. The motion vector minimizing the prediction error within the polygon 302 in the search range is registered

as a refined motion vector of the grid point 301. The refinement of the motion vector of the grid point 301 is thus completed, and a similar operation of refinement is continued by translating to another grid point. Once all the grid points are refined, the prediction error can be further reduced by repeating the refinement from the first grid point. The appropriate number of repetitions of the refinement process is reported to be two or three, col. 5 line 28 to col. 6 line 33, col. 11 line 39-45, 46-64, col. 12 line 21-27and fig. 3, 8, 9. Since image is segmented into a plurality of patches (triangular model), and motion estimation is performed with respect to each grid point (node), and the compensation is based on spatial transformation where the coarse motion is refined by a refinement algorithm until all the grid points are refined by translating to another grid point, it is clear to the examiner that the grid point (node) estimation is performed by using patches (triangular mesh) for coarse to fine motion and the motion vectors are refined from coarse to fine until all grid points are translated, which reads upon the claimed limitation.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Nakaya with Han (modified by AAPA) for providing improved motion estimation.

Regarding **claim 37**, (Han modified by AAPA and Nakaya) as a whole teaches everything as claimed above, see claim 36. Han is silent in regards to he system of Claim 36, where a coarse to fine motion representation is obtained by first transforming the motion parameters and then coding the transform coefficients using embedded quantization and coding techniques.

However, AAPA teaches where the motion representation is obtained by first transforming the motion parameters and then coding the transform coefficients using embedded quantization and coding techniques (The motion parameters are encoded using an embedded quantization and coding strategy. Such strategies are now well known to those skilled in the art, see [0098]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of AAPA with Han (modified by Nakaya) for providing improved visual quality of video content.

Regarding **claim 38**, (Han modified by AAPA and Nakaya) as a whole teaches everything as claimed above see claim 37. Han is silent in regards to the system of Claim 37, where the motion parameters are transformed by applying spatial discrete wavelet transforms and/or temporal transforms thereto.

However, AAPA teaches where the motion parameters are transformed by applying spatial discrete wavelet transforms and/or temporal transforms thereto (AAPA discloses where this earlier patent application describes a method for modifying the individual lifting steps in a lifting implementation of a temporal wavelet decomposition, so as to compensate for the effects of motion. This method has the following advantageous properties: 1) the motion sensitive transform may be perfectly inverted, in the absence of any compression artifacts; 2) the low temporal resolution subsets of the wavelet hierarchy offer high spatial fidelity so that the transform allows excellent frame rate scalability; 3) the high pass temporal detail subbands produced by the transform have very low energy, allowing high compression efficiency; 4) in the absence of

motion, the transform reduces to a regular wavelet decomposition along the temporal axis; and 5) in the presence of locally translational motion, the transform is equivalent to applying a regular wavelet decomposition along the motion trajectories, [0008]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of AAPA with Han (modified Nakaya) for providing improved visual quality of video content.

Regarding **claim 39**, Han (modified by AAPA and Nakaya) as a whole teaches everything as claimed above, see claim 38. Han is silent in regards to the system of Claim 38, wherein the spatial and/or temporal transforms are reversible integer-to-integer transforms, suitable for lossless compression.

However, AAPA teaches wherein the spatial and/or temporal transforms are reversible integer-to-integer transforms, suitable for lossless compression (AAPA discloses where reversible wavelet transforms are well-known to those skilled in the art, [0107]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of AAPA with Han (modified by Nakaya) for providing improved visual quality of video content.

Regarding **claim 40,** Han (modified by Nakaya and AAPA) as a whole teaches everything as claimed above, see claim 33. In addition, Han teaches the system of Claim 33, wherein the embedded motion bit-streams are arranged into a sequence of quality layers (fig. 3, 4, 5, and 6). Han is silent in regards to the transformed video

samples are also encoded into embedded bit-streams which are arranged into a separate sequence of quality layers.

However, AAPA teaches scalable compression refers to the generation of a bit-stream which contains embedded subsets, each of which represents an efficient compression of the original video with successively higher quality, [0004].

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of AAPA with Han (modified by Nakaya) for providing improved visual quality of video content.

Regarding **claim 41**, Han (modified by AAPA and Nakaya) as whole teaches everything as claimed above, see claim 33. Han is silent in regards to the system of Claim 33, where said interleaving of the contributions from the embedded motion bit-streams and from the transformed video samples is performed in a manner which minimizes the expected distortion in the reconstructed video sequence at each of a plurality of compressed video bit-rates.

However, AAPA teaches where interleaving of the contributions from the embedded motion bit-streams and from the transformed video samples is performed in a manner which minimizes the expected distortion in the reconstructed video sequence at each of a plurality of compressed video bit-rates (AAPA teaches scalable compression refers to the generation of a bit-stream which contains embedded subsets, each of which represents an efficient compression of the original video with successively higher quality. More importantly, if the quality with a low bit-rate version of the video is found to be insufficient, only the incremental contribution required to

achieve the next higher level of quality must be retrieved from the server, [0004]. Since the bit-stream contains embedded subsets that represent compression of the video with successively higher quality, and if the quality of the video is found to be insufficient (distorted), then only the incremental contribution required to achieve the next higher level of quality is retrieved, it is clear to the examiner, that AAPA teaches to combine the bit-stream containing embedded subsets with the incremental contributions that will reduce the insufficiency of the video content, which reads upon the claimed limitation).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of AAPA with Han for providing improved visual quality of video content.

Regarding **claim 65** see the rejection and analysis made for claim 35, except this is a claim to a method with the same limitations as the system as claim 35Thus the rejection and analysis made for claim 35 so applies here.

Regarding **claim 66**, see the rejection and analysis made for claim 36, except this is a claim to a method with the same limitations as the system as claim 36. Thus the rejection and analysis made for claim 36 also applies here.

Regarding **claim 67**, see the rejection and analysis made for claim 37, except this is a claim to a method with the same limitations as the system as claim 37. Thus the rejection and analysis made for claim 37 also applies here.

Regarding **claim 68**, see the rejection and analysis made for claim 38, except this is a claim to a method with the same limitations as the system as claim 38. Thus the rejection and analysis made for claim 38 also applies here.

Regarding **claim 69**, see the rejection and analysis made for claim 37, except this is a claim to a method with the same limitations as the system as claim 37. Thus the rejection and analysis made for claim 37 also applies here.

Regarding **claim 63**, see the rejection and analysis made for claim 1, except this is a claim to a method with the same limitations as the system as claim 1. Thus the rejection and analysis made for claim 1 also applies here

Regarding **claim 71**, see the rejection and analysis made for claim 41, except this is a claim to a method with the same limitations as the system as claim 41. Thus the rejection and analysis made for claim 41 also applies here.

Regarding **claim 70**, see the rejection and analysis made for claim 40, except this is a claim to a method with the same limitations as the system as claim 40. Thus the rejection and analysis made for claim 40 also applies here.

30. Claims 42-44, 46, 72-74, and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Han et al., US-6,845,130 in view of AAPA (Applicants Admitted Prior Art) in view of Nakaya et at al., US-5,684,538 and further in view of Well Known Prior Secker et al, Highly Scalable Video Compression Using a Lifting-Based 3D Wavelet Transform with Deformable Mesh Motion Compensation.

Regarding **claim 42**, Han (modified by AAPA and Nakaya) as a whole teaches everything as claimed above, see claim 41. Han is silent in regards to the system of Claim 41, where the measure of distortion is Mean Squared Error.

However, Secker teaches where the measure of distortion is Mean Square Error (see 4. Motion Representation, pg. 4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Secker with Han (modified by AAPA) for providing improved compression and visual quality.

Regarding **claim 43**, Han (modified by AAPA and Nakaya) as a whole teaches everything as claimed above, see claim 41. Han is silent in regards to the system of Claim 41, where the measure of distortion is a weighted sum of the Mean Squared Error contributions from different spatial frequency bands, weighted according to perceptual relevance factors.

However, Secker discloses where the measure of distortion is a weighted sum of the Mean Squared Error contributions from different spatial frequency bands, weighted according to perceptual relevance factors (where for the deformable mesh model, this error energy expansion is a direct result of local expansions in the triangular mesh itself. In our experiments, we restricted these expansions by weighting the distortion associated with each affine transform by its determinant. We immediately observed a significant improvement in reconstructed signal PSNR. We expect to obtain further improvements by adaptive the spatial quantization and coding of temporal subbands in the regions of the expansions and contraction, see 5. DISCUSSION. Since the expansion was restricted by weighting the distortion associated with each affine transformation by its determinant, and Secker suggest improvements by adapting the spatial quantization and coding of temporal subbands in the regions of the expansion, it

is clear to the examiner that the distortion is weighted by the determinant for the temporal and spatial expansion subband, which reads upon the claimed limitation).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Secker with Han (modified by AAPA) for improved compression and visual quality.

Regarding **claim 44**, Han (modified by AAPA and Nakaya) as a whole teaches everything as claimed above, see claim 41. Han is silent in regards to the system of Claim 41, where the distortion associated with inaccurate representation of the motion parameters is determined using an estimate of the spatial power spectrum of the video source.

However, Secker teaches the distortion associated with inaccurate representation of the motion parameters is determined using an estimate of the spatial power spectrum of the video source (5. DISCUSSION).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Secker with Han (modified by AAPA) for improved compression and visual quality.

Regarding claim **46**, Han (modified by AAPA) as a whole teaches everything as claimed above, see claim 44. Han is silent in regards to the system of Claim 44, where the power spectrum of the video source is estimated using spatio-temporal video sample subbands created during compression.

However, Secker teaches the power spectrum of the video source is estimated using spatio-temporal video sample subbands created during compression (Secker

teaches where the preferred paradigm is that of fed-forward compression, in which a spatio-temporal transform is followed by quantization and coding. This immediately presents the challenge of finding an alternative way of effectively exploiting motion within the spati-temporal transform itself, see I. INTRODUCTION).

Therefore, it would have been obvious to incorporate the teachings of Secker with Han (modified by AAPA and Nakaya) for providing improved compression and visual quality.

Regarding **claim 72**, see the rejection and analysis made for claim 42, except this is a claim to a method with the same limitations as the system as claim 42. Thus the rejection and analysis made for claim 42 also applies here.

Regarding **claim 73**, see the rejection and analysis made for claim 43, except this is a claim to a method with the same limitations as the system as claim 43. Thus the rejection and analysis made for claim 43 also applies here.

Regarding **claim 74**, see the rejection and analysis made for claim 44, except this is a claim to a method with the same limitations as the system as claim 44. Thus the rejection and analysis made for claim 44 also applies here.

Regarding **claim 76**, see the rejection and analysis made for claim 46, except this is a claim to a method with the same limitations as the system as claim 46. Thus the rejection and analysis made for claim 46 also applies here.

31. Claims 45, 47-48, 75, and 77-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Han et al., US-6,845,130 in view of AAPA (Applicants Admitted Prior

Art) in view of Nakaya et at al., US-5,684,538 and further in view of Well Known Prior Art (Official Notice).

Regarding **claim 45**, Han (modified by AAPA and Nakaya) as whole teaches everything as claimed above, see claim 41. Han is silent in regards to the system of Claim 4l, where the distortion associated with inaccurate representation of the motion parameters is determined using information about the spatial resolution at which the video bit-stream is to be decompressed.

However, official notice is taken that the benefit and advantage of providing the limitation as claimed is notoriously well known and expected in the art, and therefore would have been obvious to incorporate with Han (modified by AAPA) for providing improved visual quality.

Regarding **claim 47**, Han (modified by AAPA) as a whole teaches everything as claimed above, see claim 33. Han is silent in regards to the system of Claim 33, wherein the proportions of contributions from said embedded motion fields and said transformed video samples in the embedded bit-stream is determined on the basis of a plurality of tables associated with each frame, each table being associated with a spatial resolution at which the video bit-stream is to be decompressed.

However, official notice is taken that the benefit and advantage of providing the limitation as claimed is notoriously well known and expected in the art, and therefore would have been obvious to incorporate with Han (modified by AAPA) for providing improved visual quality.

Regarding **claim 48**, Han (modified by AAPA) as a whole teaches everything as claimed above, see claim 47. Han is silent in regards to the system of Claim 47, wherein the embedded motion bit-streams and the transformed video samples are each encoded as a series of quality layers and the tables identify the number of motion quality layers are to be included with each number of video sample quality layers.

However, official notice is taken that the benefit and advantage of providing the limitation as claimed is notoriously well known and expected in the art, and therefore would have been obvious to incorporate with Han (modified by AAPA) for providing improved visual quality.

Regarding **claim 75**, see the rejection and analysis made for claim 45, except this is a claim to a method with the same limitations as the system as claim 45. Thus the rejection and analysis made for claim 45 also applies here.

Regarding **claim 77**, see the rejection and analysis made for claim 47, except this is a claim to a method with the same limitations as the system as claim 47. Thus the rejection and analysis made for claim 47 also applies here.

Regarding **claim 78,** see the rejection and analysis made for claim 48, except this is a claim to a method with the same limitations as the system as claim 48. Thus the rejection and analysis made for claim 48 also applies here.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JESSICA PRINCE whose telephone number is (571)270-1821. The examiner can normally be reached on 7:30-5:00 EST Monday-Friday, Alt Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha D. Banks-Harold can be reached on (571) 272-7905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Marsha D. Banks-Harold/
Supervisory Patent Examiner, Art Unit 2482

/JESSICA PRINCE/
Examiner, Art Unit 2482